

## **Historic, archived document**

Do not assume content reflects current scientific knowledge, policies, or practices.



AD2346  
U5P76

5



United States  
Department of  
Agriculture

Science and  
Education

Office of  
Grants and  
Program Systems

# Program Solicitation

## Small Business Innovation Research Program

Fiscal Year 1987

RECEIVED  
FBI  
MARCH 1987

60-181-10

9/28/90  
10/3/90

Closing Date: November 17, 1986

331



# CONTENTS

	<i>Page</i>
<b>1.0 General Program Description</b>	<b>1</b>
1.1 Introduction	1
1.2 Three-phase Program	1
1.3 Follow-on Funding	1
1.4 Eligibility and Limitations	2
<b>2.0 Definitions</b>	<b>2</b>
2.1 Research or Research and Development	2
2.2 Small Business	2
2.3 Minority and Disadvantaged Small Business	3
2.4 Women-owned Small Business	3
2.5 United States	3
2.6 Program Solicitation	3
2.7 Subcontract	3
2.8 Funding Agreement	3
<b>3.0 Proposal Preparation Instructions and Requirements</b>	<b>4</b>
3.1 Proposal Requirements	4
3.2 General Content	4
3.3 Proposal Format	4
<b>4.0 Method of Selection and Evaluation Criteria</b>	<b>7</b>
4.1 Introduction	7
4.2 Initial Screening Criteria	7
4.3 Phase I Evaluation Criteria	8
4.4 Phase II Evaluation Criteria	8
4.5 Notice to Proposers	8
<b>5.0 Considerations</b>	<b>9</b>
5.1 Awards	9
5.2 Reports	9
5.3 Payment Schedules	9
5.4 Proprietary Information	9
5.5 Rights in Technical Data	10
5.6 Copyrights	10
5.7 Patents and Inventions	10
5.8 Cost-sharing	10
5.9 Profit or Fee	10
5.10 Joint Ventures and Limited Partnerships	10
5.11 Research and Analytical Work	10
5.12 Research Involving Special Considerations	11
5.13 Grantee Commitments	11
5.14 Additional Information	11
<b>6.0 Submission of Proposals</b>	<b>13</b>
6.1 Deadlines for Proposals	13
6.2 Number of Copies	13
6.3 Address	13
6.4 Acknowledgment of Proposals	13
6.5 Bindings	13
6.6 Packaging	13
<b>7.0 Contact with USDA</b>	<b>14</b>
7.1 Questions Pertaining to the USDA SBIR Program or to this Solicitation	14
7.2 Requests for Additional Copies of this Solicitation	14
7.3 Information on Proposal Status	14

<b>8.0 Research Topic Descriptions</b>	14
8.1 Forests and Related Resources	14
8.2 Plant Production and Protection	15
8.3 Animal Production and Protection	15
8.4 Air, Water, and Soils	16
8.5 Food Science and Nutrition	16
8.6 Rural and Community Development	17
<b>Appendixes</b>	19
A. Proposal Cover Sheet (Phase I)	19
B. Project Summary (Phases I and II)	21
C. Budget	23
D. Organizational Management Information	25
E. Assurance of Compliance	27



# USDA'S PROGRAM SOLICITATION SMALL BUSINESS INNOVATION RESEARCH FISCAL YEAR 1987

## 1.0 GENERAL PROGRAM DESCRIPTION

### 1.1 Introduction

The U.S. Department of Agriculture (USDA) invites science-based small business firms to submit research proposals under this program solicitation entitled "Small Business Innovation Research Program, Fiscal Year 1987." Firms with strong scientific research capabilities in any of the topic areas described in section 8.0 are encouraged to participate. USDA will support high-quality research or research and development (R&D) proposals containing advanced concepts related to important scientific problems and opportunities that could lead to significant public benefit if the research is successful.

Objectives of the Small Business Innovation Research (SBIR) Program include stimulating technological innovation in the private sector, strengthening the role of small businesses in meeting Federal research and development needs, increasing private sector commercialization of innovations derived from USDA-supported research and development efforts, and fostering and encouraging participation by minority and disadvantaged small business firms in technological innovation. Questions of a general nature about this SBIR solicitation should be directed to the SBIR coordinator as listed in subsection 7.1.

### 1.2 Three-phase Program

This program solicitation is issued pursuant to the Small Business Innovation Development Act of 1982, Public Law 97-219, and Section 1472 of the National Agricultural Research, Extension, and Teaching Policy Act of 1977, as amended (7 U.S.C. 3318). The program will be carried out in three separate phases. Under phase I, USDA anticipates making approximately 25 awards to small businesses during fiscal year 1987, with each award ranging up to \$50,000 for a period normally not to exceed 6 months. Phase I is to determine, if possible, the scientific or technical feasibility of ideas submitted by proposers on research topic areas described in section 8.0 of this solicitation.

The phase I proposal should concentrate on research which will significantly contribute to **proving** the scientific or technical feasibility of the approach or concept and which would be a prerequisite to further USDA support in phase II.

Phase II awards will be made during fiscal year 1987 to firms with approaches that appear sufficiently promising as a result of phase I studies. **Only those small businesses previously receiving phase I awards in fiscal years 1985 and 1986 are eligible to submit phase II proposals in fiscal year 1987. Please note, however, that a phase I awardee may apply**

**for a phase II award only once.** Phase I awardees in fiscal year 1986 who are unable to submit phase II proposals for valid reasons during the fiscal year 1987 funding cycle should apply for phase II support no later than the fiscal year 1988 funding cycle. While USDA does not place upper and lower limits on phase II budget requests, the typical level of support for individual projects is expected to be in the \$150,000 to \$250,000 range for a period normally not to exceed 24 months. It is anticipated that approximately one-third of phase I awardees will receive phase II grants, depending upon phase I results, the scientific and technical merit of the phase II proposal, and the availability of funds. Phase II is the principal research or research and development effort and will require a more comprehensive application, outlining the proposed effort in detail. In January 1987, the SBIR coordinator will send a letter to all eligible phase I awardees requesting phase II proposals. The letter will provide instructions for preparing phase II proposals and a deadline date for submitting applications. USDA recognizes that phase II awards may not necessarily complete the total research and development that may be required to satisfy commercial or Federal needs beyond the SBIR program. Therefore, completion of the research will probably have to be accomplished through phase III.

Phase III, to be conducted by the small business firm (including joint ventures and limited partnerships), will be privately funded by a non-Federal source through the use of a follow-on funding commitment. The purpose of phase III is to stimulate technological innovation and the national return on investment from research through the pursuit of commercial objectives resulting from the USDA-supported work carried out in phases I and II.

**This program solicitation is for phase I proposals only.** However, it also may be useful for phase II applicants because it contains many of the necessary forms, instructions for proposal preparation and submission, evaluation criteria, and other relevant information.

### 1.3 Follow-on Funding

In addition to supporting scientific research and development, another important goal of this program is to provide incentive and opportunity for small firms to convert USDA-sponsored research to technological innovation in the private sector. Proposers are asked to consider whether the research they are proposing to USDA also has commercial possibilities either for the proposed application or as a base for other applications. If it appears to have such potential, proposers are encouraged, on an optional basis, to obtain a contingent commitment for

non-Federal follow-on funding to pursue further development of the commercial potential beyond the Government-funded research phases. Government funding pays for research relating to Federal objectives (phases I and II); non-Federal funding pays for development of commercial objectives (phase III).

The commitment for follow-on venture capital or other funding **must be obtained by the proposer**. It is understood that the commitment will be contingent upon the achievement of certain technical objectives mutually agreed upon between the small business and the provider of the follow-on capital. A few clearly defined and measurable objectives should be stated in the commitment agreement at the threshold level that would justify non-Federal investment if those technical objectives were achieved in phase II. The objectives do not have to be the same as those stated in the proposal, but they must be able to be accomplished within the scope of the proposed Government-funded research.

Proposers in phase I should briefly describe any potential commercial application(s) and whether or not the firm plans to secure follow-on non-Federal funding to pursue continuing development toward commercial objectives. To receive special consideration during the phase II review process, a signed contingent commitment between the small business firm and a non-Federal source is requested approximately 90 days following the end of the phase I performance period. The commitment is optional but will receive special consideration as a point of merit in the review process where proposals are evaluated as being of approximately equal technical merit. **The maximum value (in phase II evaluation) will be given for**

**a signed formal agreement with reasonable terms and funding equal to or in excess of the Federal investment requested in the phase II proposal.** The agreement should set forth the specific amount of phase III funds and should indicate the dates that such funds will be made available to the small business. Also, the agreement should contain a few specific technical objectives which, if achieved in phase II, will make the commitment usable by the small business. The terms cannot be contingent upon the obtaining of a patent, due to the length of time this process requires.

The commitment may be in the form of venture capital or a package including venture capital, contract research and development, joint venture, a research and development limited partnership, or other agreement with a non-Federal source. No amortization, repayment, or repurchase of commitment funds may be included during the phase II period of performance.

If desired, phase III funding may be advanced and invested during phase II to accelerate the research and development process.

## 1.4 Eligibility and Limitations

Each organization submitting a proposal must qualify as a small business for research purposes, must be the primary employer of the principal investigator at the time of award and during the conduct of the actual research, and must be the primary performer of the research and development effort (see definitions in section 2.0). In addition, the work must be performed by the small business concern in the United States.

# 2.0 DEFINITIONS

The following definitions apply for purposes of this solicitation:

## 2.1 Research or Research and Development

Research or research and development (R&D) means any activity which is:

- (A) A systematic, intensive study directed toward greater knowledge or understanding of the subject studied;
- (B) A systematic study directed specifically toward the application of new knowledge to meet a recognized need; or
- (C) A systematic application of knowledge toward the production of useful materials; devices; and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.

## 2.2 Small Business

Small business means a firm or concern which **at the time of award** of phase I and phase II funding agreements meets the following criteria:

- (A) Is organized for profit, independently owned or operated, is not dominant in the field in which it is proposing, has its principal place of business located in the United States, has a number of employees not exceeding 500 (full-time, part-time, temporary, or other) in all affiliated firms owned or controlled by a single parent firm, and meets the other regulatory requirements outlined in 13 CFR Part 121, as amended. Business concerns, other than licensed investment companies, or State development companies qualifying under the Small Business Investment Act of 1958, 15 U.S.C. 661, et seq., are affiliates of one another when directly or indirectly (1) one concern



controls or has the power to control the other or (2) third parties (or party) control or have the power to control both. Control can be exercised through common ownership, common management, and contractual relationships. The term “affiliates” is defined in greater detail in 13 CFR 121.3-2(a). The term “number of employees” is defined in 13 CFR 121.3-2(t). Business concerns include, but are not limited to, any individual, partnership, corporation, joint venture, association, or cooperative. Awards to joint ventures and limited partnerships are permitted provided that the proposing entity **qualifies as a small business** in accordance with the Small Business Act, 15 U.S.C. 631, and the above definition.

- (B) Is at least 51 percent owned, or in the case of a publicly owned business at least 51 percent of its voting stock is owned, by United States citizens or lawfully admitted permanent resident aliens.
- (C) Is the primary source of employment of the principal investigator of the proposed effort **at the time of award** and during the conduct of the proposed research. Primary employment means that more than one-half of the principal investigator’s time is spent in the employ of the small business. Primary employment with the small business applicant precludes full-time employment with another organization. This requirement applies to both phase I and phase II awards.
- (D) Is the primary performer of the proposed research effort. Because the program is intended to increase the use of small business firms in Federal research or R&D, the term “primary performer” means that a minimum of **two-thirds** of the research or analytical work must be performed by the proposing organization under **phase I grants**. For **phase II awards**, a minimum of **one-half** of the research or analytical effort must be conducted by the proposing firm.

## 2.3 Minority and Disadvantaged Small Business

A minority and disadvantaged small business is a concern or a firm:

- (A) Which is at least 51 percent owned by one or more minority and disadvantaged individuals or, in the case of any publicly owned business, one in which at least

51 percent of the voting stock is owned by one or more minority and disadvantaged individuals.

- (B) Whose management and daily business operations are controlled by one or more of such individuals.

For purposes of this solicitation, a minority and disadvantaged individual is defined as a member of any of the following groups: Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, or Asian-Indian Americans.

## 2.4 Women-owned Small Business

Women-owned small business means a concern that is at least 51 percent owned by a woman or women who also control and operate it. “Control” as used in this context means exercising the power to make policy decisions. “Operate” as used in this context means being actively involved in the day-to-day management of the organization.

## 2.5 United States

United States means the several States, the territories and possessions of the United States, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, the Trust Territory of the Pacific Islands, and the District of Columbia.

## 2.6 Program Solicitation

A program solicitation is a formal request for proposals whereby an agency notifies the small business community of its research or R&D needs and interests in selected areas and invites proposals from small business concerns in response to these needs.

## 2.7 Subcontract

A subcontract is any agreement, other than one involving an employer-employee relationship, entered into by an awardee of an SBIR funding agreement and a third party calling for supplies or services required solely for the performance of the original funding agreement.

## 2.8 Funding Agreement

A funding agreement is any contract, grant, or cooperative agreement entered into between any Federal agency and any small business for the performance of experimental, developmental, or research work funded in whole or in part by the Federal Government.

## 3.0 PROPOSAL PREPARATION INSTRUCTIONS AND REQUIREMENTS

### 3.1 Proposal Requirements

This is a solicitation for **phase I research proposals on advanced concepts** from small business firms which have strong research capabilities in the basic and applied sciences.

The proposed research must be responsive to one of the USDA program interests stated in the research topic descriptions of this solicitation. However, the same research can often be the basis for technological innovation, new commercial products, processes, or services which benefit the public. This is a desirable economic objective, and such proposals are encouraged.

Proposals must cover only scientific research activities. A firm **must not propose product development, technical assistance, demonstration projects, literature surveys, classified research, or patent applications. Proposals principally for the development of proven concepts toward commercialization or for market research should not be submitted**, since such efforts are considered the responsibility of the private sector and therefore are not supported by USDA.

**A proposal must be limited to only one topic**, the title of which must be entered on the cover sheet of the application. The same proposal may not be submitted under more than one topic. However, an organization may submit separate proposals on different topics or different proposals on the same topic under this solicitation. Where similar research is discussed under more than one topic, the proposer should choose that topic whose description appears most relevant to the proposer's research concept. Proposers may respond to any of the topics listed under section 8.0 below. Research may be carried out through the construction and evaluation of a laboratory prototype, where necessary. **Duplicate proposals will be returned to the applicant without review.**

The purpose of a research proposal is to provide a written statement that contains sufficient information to persuade USDA, as well as members of the research community who review the proposal and advise USDA staff members, that the proposed research is a sound approach to an important scientific question and is worthy of support under the stated USDA evaluation criteria. (See section 4.0.)

The proposal should be self-contained and written with the care and thoroughness accorded papers for publication. Each proposal should be reviewed carefully by the applicant and by others knowledgeable on the subject to ensure inclusion of data essential for comprehensive evaluation.

The scientific or technical merit of the proposed research is the primary concern for all research supported by USDA. **The quality of the research proposal will be the principal basis**

**upon which all proposals will be evaluated and selected for funding.**

### 3.2 General Content

This solicitation is designed to reduce the investment of time and cost to small business firms in preparing formal proposals. Those who wish to respond should submit a research proposal of **no more than 25 pages**, including cover page, budget, and all **proposal-related** enclosures or attachments. The text must be prepared on only one side of the page using standard 8½" x 11" white paper, with no type smaller than elite regardless of whether it is single or double spaced. In the interest of equity to all proposers, no additional attachments, appendixes, or references beyond the 25-page limitation will be considered in the proposal evaluation process, and proposals in excess of the 25-page limitation will not be considered for review or award. In addition, supplementary materials, **revisions**, and/or substitutions **will not be accepted after the due date for proposals**. For phase II proposers, this page limitation does not apply.

It is not necessary to provide a lengthy discourse on commercial applications in the phase I proposal except to discuss them briefly under subsection 3.3(C), as appropriate, as well as under subsection 3.3(G)(1). The phase I proposal must be principally directed at feasibility-related research or R&D on the specific topic chosen.

### 3.3 Proposal Format

- (A) **Cover Sheet** — Photocopy and complete the form in appendix A and use it as page 1 of the proposal. All pages must be consecutively numbered. The original of the cover sheet must at a minimum contain the pen-and-ink signatures of the proposed principal investigator(s) and the authorized organizational official. A submitting principal investigator whose signature does not appear on the cover sheet will not be listed as a principal investigator in the event of an award. A proposal which does not contain the signature of the authorized organizational official will not be considered a legal document and will be returned to the proposing small business firm without review. All other copies of the proposal must also contain a cover sheet, but facsimile or photocopied signatures will be accepted. The title should be a brief (80-character maximum), clear, specific designation of the research proposed. It will be used to provide information to Congress and also will be used in issuing press releases. Therefore, it should not contain highly technical words. In addition, phrases such as "investigation of" or "research on" should not be used.



- (B) **Project Summary** — Photocopy and complete the form identified as appendix B and use it as page 2 of the proposal. The technical abstract should include a brief description of the problem or opportunity, project objectives, and a description of the effort. Anticipated results and potential commercial applications of the proposed research also should be summarized in the space provided. Keywords, to be provided in the last block on the page, should characterize the most important aspects of the project.

**The Project Summary of successful proposers may be published by USDA and, therefore, should not contain proprietary information.**

- (C) **Proposal** — Begin the main body of the proposal on page 3 and include:

- (1) **Identification and Significance of the Problem or Opportunity** — Clearly state the specific technical problem or opportunity addressed and its importance.
- (2) **Background and Rationale** — Indicate the overall background and technical approach to the problem or opportunity and the part that the proposed research plays in providing needed results.
- (3) **Anticipated Results** — State the anticipated results of the approach if the project is successful and is carried over into phases II and III. This should address: (a) the technical, economic, social, and other benefits to the Nation and to users of the results such as the commercial sector, the Federal Government, or other researchers; (b) the estimated total cost of the approach relative to benefits; and, if appropriate, (c) any specific policy issues or decisions which might be affected by the results.
- (4) **Foundation for Phase II** — Discuss the significance of the phase I effort in **providing a foundation** for the phase II R&D effort.
- (5) **Phase I Technical Objectives** — State the **specific** objectives of the research or research and development effort, including the technical questions it will try to answer to determine the feasibility of the proposed approach.
- (6) **Phase I Work Plan** — This work plan must provide an explicit, detailed description of the research or research and development approach. The plan should indicate the tasks to be performed as well as how and where the work will be carried out. The phase I effort should attempt to determine the technical feasibility of the

proposed concept. The work plan should be linked with the technical objectives of the research and the questions the effort is designed to answer. Therefore, it should flow logically from 3.3(C)(5) above. **This section should constitute a substantial portion of the total proposal.**

- (7) **Related Research or Research and Development** — Describe the significant research or research and development activities from relevant literature that are directly related to the proposed effort, including any conducted by the principal investigator or by the proposing firm, how it relates to the proposed effort, and any planned coordination with outside sources. The proposer must persuade reviewers that he or she is aware of related research in the selected subject.
- (D) **Key Personnel and Bibliography** — Identify key senior personnel involved in the effort, including information on their directly related education and experience. For each key person, provide a chronological list of the most recent representative publications in the topic area during the preceding 5 years, including those in press. List the authors (in the same order as they appear on the paper), the full title, and the complete reference as these usually appear in journals. Where vitae are extensive, summaries that focus on the most relevant experience or publications may be necessary to meet the proposal size limitation in phase I.
- (E) **Facilities and Equipment** — Describe the types, location, and availability of instrumentation and physical facilities necessary to carry out the work proposed. Items of equipment to be purchased must be fully justified under this section.
- (F) **Consultants** — Involvement of university or other consultants in the planning and research stages of the project is permitted and may be particularly helpful to small firms which have not previously received Federal research awards. If such involvement is intended, it should be described in detail. Proposals should include letters from proposed consultants indicating willingness to serve. (See subsection 4.3(D) or 4.4(E), as appropriate.)
- (G) **Potential Post Application** — Briefly describe:
  - (1) Whether and by what means the proposed research appears to have potential commercial application; and
  - (2) Whether and by what means the proposed research appears to have potential use by the Federal Government.

(H) **Current and Pending Support** — If a proposal, substantially the same as the one submitted in response to this solicitation, has been previously funded or is currently funded, pending, or about to be submitted to another Federal agency or to USDA in a separate action, the proposer must provide the following information:

- (1) Name and address of the agency(s) to which a proposal was submitted, or will be submitted, or from which an award is expected or has been received.
- (2) Date of actual or anticipated proposal submission or date of award, as appropriate.
- (3) Title of proposal or award, identifying number assigned by the agency involved, and the date of program solicitation under which the proposal was submitted or the award was received.
- (4) Applicable research topic area for each proposal submitted or award received.
- (5) Title of research project.
- (6) Name and title of principal investigator for each proposal submitted or award received.

**USDA will not make awards that duplicate research funded (or to be funded) by other Federal agencies.**

(I) **Cost Breakdown on Proposal Budget** — Photocopy and complete the form shown in appendix C (Form S&E-55) only for the **phase under which you are currently applying**. (An applicant for phase I funding should not submit both phase I and II budgets.) Please note the following in completing the budget:

- (1) **Salaries and Wages** — Indicate the number and kind of personnel for whom salary support is sought. For key personnel, also indicate the number of work months of involvement to be supported with USDA funds (see blocks labeled “S&E Funded Work Months”).
- (2) **Equipment and Travel** — Performing organizations are expected to have appropriate facilities, suitably furnished and equipped. However, items of equipment may be requested provided that they are specifically identified and adequately justified (see item (E) of this section). Equipment is defined as an article of

nonexpendable, tangible personal property having a useful life of more than 2 years and an acquisition cost of \$500 or more per unit. **Vesting of title to equipment purchased with funds provided under an SBIR funding agreement will be determined by USDA. Awardees should plan to lease expensive equipment.**

**Foreign travel may not be included in the phase I budget** but may be included as necessary in phase II proposals. The inclusion of either equipment or foreign travel will be carefully reviewed with respect to need and appropriateness for the research proposed.

(3) **Subcontracting Limits** — Subcontracting as defined in the program solicitation may not exceed one-third of the research or analytical effort during phase I and one-half of the research or analytical effort during phase II. In addition, subcontractors must perform their portion of the work in the United States. If subcontracting costs are anticipated, they should be indicated in block I, “All Other Direct Costs,” on the budget sheet. A breakdown of subcontractual costs is required. **Note: For proposals involving subcontractual or consulting arrangements, USDA encourages the applicant to submit an agreement or letter of intent signed by the subcontractor or consulting firm’s authorized organizational official** (see subsection 4.3(D) or 4.4(E), as appropriate).

(4) **Fee** — A reasonable fee is permitted under this program solicitation, but proposers are encouraged to minimize fee requests due to the small amount of funds available. **All fees are subject to negotiation with USDA.** If a fee is requested, the amount should be indicated in block I, “All Other Direct Costs,” on the budget sheet.

(5) **Indirect Costs** — If available, the current rate negotiated with the cognizant Federal negotiating agency should be used. If no rate has been negotiated, a reasonable dollar amount in lieu of indirect costs may be requested, which will be subject to approval by USDA. A proposer may elect not to charge indirect costs and, instead, use all grant funds for direct costs. If a negotiated rate is used, the percentage and base should be indicated in the space allotted under item K on the budget sheet. If indirect costs are not charged, the phrase “None requested” should be written in this space.



## 4.0 METHOD OF SELECTION AND EVALUATION CRITERIA

### 4.1 Introduction

Phase I and phase II proposals will be judged competitively in a two-stage process, based primarily upon scientific or technical merit. First, each proposal will be screened by USDA scientists to ensure that it is responsive to stated requirements contained in this solicitation. (See subsection 4.2.) Proposals found to be responsive will be technically evaluated by peer scientists knowledgeable in the appropriate scientific field using the criteria listed in subsection 4.3 or subsection 4.4, as appropriate. Each proposal will be judged on its own merits.

**Unsolicited proposals or proposals not responding to research topic areas outlined in section 8.0 of this program solicitation are not eligible to be considered for a phase I SBIR award and, hence, will be returned to the proposing firm without review.**

**Both internal and external peer reviewers will be used during the technical evaluation stage of this process.** Selections will be made from among recognized specialists who are uniquely qualified by training and experience in their respective fields to render expert advice on the merit of proposals received. It is anticipated that such experts will include private consultants as well as those located in universities, Government, and non-profit research organizations. If possible, USDA intends that peer review groups shall be balanced with minority and female representation and with an equitable age distribution.

Final decisions will be made by USDA based upon the ratings assigned by reviewers and consideration of other factors, **including the potential commercial application and follow-on funding plan**, possible duplication of other research, any critical USDA requirements, program balance, and budget limitations. There is no commitment by USDA to fund any particular proposal, to support any specific number of proposals in a given research topic area, or to make a specific number of awards under either phase I or phase II. USDA also may elect to fund several or none of the proposed approaches to the same topic. Care will be taken to avoid actual and potential conflicts of interest among reviewers. Evaluations will be confidential to USDA staff members, peer reviewers, and the proposed principal investigator(s) to the extent permitted by law.

### 4.2 Initial Screening Criteria

To avoid misunderstanding, applicants should be aware that **proposals not satisfying all of the screening criteria may be returned to the proposing small business without review. Returned proposals may not be resubmitted** (with or without revision) **under this solicitation.** The initial screening criteria are the following:

- (A) The proposing firm must qualify as a small business as defined in subsection 2.2.
- (B) The Phase I proposal, including cover page, budget page, and proposal-related attachments, **may not exceed 25 pages in length**, regardless of type size or spacing. **Phase I proposals exceeding this 25-page limit will be returned without review. This page restriction does not apply to phase II proposals.**
- (C) Phase I proposals must be limited to one topic; however, a firm is free to submit several different proposals, each covering different approaches or topics. **Duplicate proposals will be returned without review.**
- (D) Phase I proposal budgets including subcontracts, consultant charges, indirect costs, and fees, should not exceed \$50,000. Phase II budgets, including all proposed costs, should not exceed \$250,000.
- (E) The proposed duration of phase I projects should not exceed 6 months, except in unusual, justified circumstances, and the duration of phase II proposals should not exceed 24 months.
- (F) The principal investigator's primary employment, that is, more than **one-half time**, must be with the small business concern at the time of award and during the conduct of the research. Primary employment with the applicant small business precludes full-time employment with another organization. (See subsection 2.2(C).) In addition, the work must be performed in the United States. (See subsection 1.4.)
- (G) A minimum of two-thirds of the research and/or analytical effort under each SBIR phase I proposal must be carried out by the proposing firm, while a minimum of one-half of the research and/or analytical effort must be carried out by the proposing firm under phase II.
- (H) **Foreign travel may not be included in phase I budgets** but may be included as necessary in phase II budgets.
- (I) Proposals must cover scientific research activities only. (See subsection 3.1.)
- (J) The proposed phase I research must fall within a solicited topic area. (See section 8.0 for the listing of research topic descriptions.)

- (K) A proposal must contain adequate information to be reviewed as research. **USDA reserves the right not to submit for review** any proposal which it finds to have insufficient information.

### 4.3 Phase I Evaluation Criteria

USDA plans to select for award those proposals offering the best value to the Nation, with approximately equal consideration given to each of the following criteria **except for item (A), which will receive twice the value of any of the other items:**

- (A) **The scientific/technical** quality of the phase I research plan and its relevance to the stated objectives, with special emphasis on innovativeness and originality.
- (B) **Importance of the problem or opportunity and anticipated benefits** of the proposed research, if successful.
- (C) **Adequacy of the phase I objectives** to show incremental progress toward proving the feasibility of approach.
- (D) **Qualifications of the principal investigator(s)**, other key staff and consultants, and the probable adequacy of available or obtainable instrumentation and facilities.

### 4.4 Phase II Evaluation Criteria

A phase II proposal may be submitted **only** by a phase I awardee. The phase II proposal, along with the phase I final report, will be reviewed for overall merit based on the following criteria with each item receiving approximately equal weight **except for item (A), which will receive twice the value of any of the other items:**

- (A) The scientific/technical quality of the proposed research, with special emphasis on innovativeness and originality.
- (B) Degree to which phase I objectives were met (as indicated in phase I final report).

- (C) The technical, economic, and/or social importance of the problem or opportunity and anticipated benefits if phase II research is successful.
- (D) The adequacy of the phase II objectives to meet the problem or opportunity.
- (E) The qualifications of the principal investigator(s) and other key personnel to carry out the proposed work.
- (F) Reasonableness of the budget requested for the work proposed.

In the event that two or more proposals are of approximately equal technical merit, the follow-on funding commitment for continued development will be an important consideration. The value of the commitment will depend upon the degree of commitment made by non-Federal investors, with the **maximum value resulting from a signed agreement with reasonable terms for an amount at least equal to the funding requested from USDA in phase II.**

### 4.5 Notice to Proposers

Technical reviewers will base their conclusions and recommendations on information contained in the phase I or phase II proposal. It cannot be assumed that reviewers are acquainted with any experiments referred to within a proposal, with key individuals, or with the firm itself.

After final decisions have been announced, written reviews of the proposal will be sent to the proposed principal investigator(s) involved **upon written request**, but the reviews will not include the identities of the reviewers. Due to funding limitations and USDA's desire to support as many worthwhile projects as possible, it may be necessary for USDA to reduce the amount of an award below the amount requested by a small business firm (or to fund only certain objectives outlined in the proposal). Any significant changes will be discussed with the proposing firm, which may then be asked to submit a revised budget reflecting the reduced amount. In the event that this occurs, specific instructions will be provided to the proposer.



## 5.0 CONSIDERATIONS

### 5.1 Awards

USDA expects to make approximately 25 phase I awards ranging up to \$50,000 each to small businesses in fiscal year 1987, depending upon the availability of funds. Awards will be made no later than September 30, 1987. USDA will announce the names of those firms receiving awards, and successful proposers will then normally have 6 months after awards are made to carry out their proposed phase I effort.

It is anticipated that approximately 10 of the fiscal year 1986 phase I awardees will receive phase II awards, depending upon the results of the phase I efforts and the availability of funds. All phase II awards are expected to range between \$150,000 and \$250,000. The purpose of phase II is to further develop ideas explored under phase I.

In accordance with the guidelines contained in 31 U.S.C. 6301-6308 and the authority contained in Section 1472 of Public Law 97-98, **all phase I and phase II awards will be issued as research grants.** Small fees (that is, estimated profit) will be permitted under both phases of this program.

### 5.2 Reports

An original and two copies of a comprehensive single final performance report on the phase I SBIR project must be submitted to the USDA SBIR coordinator within 30 days following expiration of the grant. The report should include a single-page project summary as the first page. This summary should include the purpose of the research; a brief description of the research carried out; the research findings or results; and, in a final paragraph, potential applications (commercial or other) of the research. The balance of the report should include a comparison of actual accomplishments with the goals established for the grant, the reasons for slippage if established goals were not met, estimates of technical feasibility, and additional pertinent information such as an explanation of cost overruns or unexpectedly high unit costs. In addition, please identify all other recipients (public and private) of the research results documented in the phase I report. This report should be submitted to:

Dr. Olga v.H. Owens  
SBIR Coordinator  
Competitive Research Grants  
Office of Grants and Program Systems  
U.S. Department of Agriculture  
Room 112, Justin Smith Morrill Building  
15th and Independence Avenue, S.W.  
Washington, D.C. 20251  
Telephone: (202) 447-7002

01 0002

A final "Financial Status Report" (SF-269) is due within 90 days after the expiration date of the grant, and should be sub-

mitted to the Cooperative Funds Division at the address listed below, in accordance with instructions contained in Section 3015.82 of the Uniform Federal Assistance Regulations.

Mr. Garland Heare  
Director, Cooperative Funds Division  
Cooperative Management Staff, ES  
U.S. Department of Agriculture  
Room 202, Justin Smith Morrill Building  
15th and Independence Avenue, S.W.  
Washington, D.C. 20251  
Telephone: (202) 447-9527

### 5.3 Payment Schedules

Payments will be made to the recipient either by advance or reimbursement Treasury check. The specific method and frequency of payment, as well as required forms and pertinent submission instructions for each project, will be provided to the small business firm when the funding agreement is forwarded to it for acceptance.

### 5.4 Proprietary Information

Information contained in unsuccessful proposals will remain the property of the proposer. However, USDA will retain one file copy of all proposals received; extra copies will be destroyed. Public release of information for any proposal submitted will be subject to existing statutory and regulatory requirements.

If a proposal contains proprietary information that constitutes a trade secret, proprietary commercial or financial information, confidential personal information, or data affecting the national security, it will be treated in confidence to the extent permitted by law, provided the information is clearly marked by the proposer with the term "confidential proprietary information" and provided the following legend also appears in the designated area at the bottom of the proposal's cover sheet. (See appendix A.)

"For any purpose other than to evaluate the proposal, this data shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed in whole or in part, provided that if a funding agreement is awarded to this proposer as a result of, or in connection with, the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the funding agreement. This restriction does not limit the Government's right to use information contained in the data if it is obtained from another source without restriction. The data subject to this restriction is contained in pages \_\_\_\_\_ of this proposal."

**Any other legend may be unacceptable to USDA and may constitute grounds for returning the proposal without further consideration and without assuming any liability for inadvertent disclosure.** USDA will limit dissemination of such information to its employees and, where necessary for the evaluation of the proposal, to external reviewers.

The inclusion of proprietary information is discouraged unless it is necessary for the proper evaluation of the proposal. The proprietary information included should be limited, set off on a separate page, and keyed to the text by numbers. It should be confined to a few critical technical items which, if disclosed, could jeopardize the obtaining of foreign or domestic patents. Also, trade secrets, salaries, or other information which could jeopardize commercial competitiveness should be keyed and set off on a separate page. Proposals or reports which set off any large amount of information may be found unacceptable by USDA.

Since technical reports by the principal investigator(s) may be made available to the public, such reports shall not contain any restrictive language purporting to limit their use other than that which is set off on a proprietary page. However, USDA normally will honor a request to delay release of the report for 6 months, or longer if reasonable, so that the proposer may seek patent protection or follow-on funding where appropriate.

## **5.5 Rights in Technical Data**

Rights in technical data, including software developed under the terms of any funding agreement resulting from a proposal submitted in response to this solicitation, shall remain with the grantee. However, the Government shall have the limited right to use such data for governmental purposes and shall not release such data outside the Government without permission of the grantee for a period of 2 years from completion of the project under which the data were generated. Effective at the conclusion of the 2-year period, the Government shall retain a royalty-free license for governmental use of any technical data delivered under the agreement, whether patented or not.

## **5.6 Copyrights**

With prior written permission of the authorized departmental officer, the grantee normally may copyright and publish (consistent with appropriate national security considerations, if any) material developed with USDA support. USDA receives a royalty-free license for the Federal Government and requires that each publication contain the following acknowledgment and disclaimer statement:

“This material is based upon work supported by the U.S. Department of Agriculture under Grant No. (awardee should enter agreement number here). Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Department of Agriculture.”

The last sentence may be omitted from articles published in scientific journals.

## **5.7 Patents and Inventions**

Allocation of rights to inventions shall be in accordance with 35 U.S.C. 202-204 and OMB Circular No. A-124. These regulations provide that small business firms normally may retain the principal worldwide patent rights to any invention developed with USDA support. USDA receives a royalty-free license for Federal Government use, reserves the right to require the patentee to license others in certain circumstances, and requires that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically. To the extent authorized by 35 U.S.C. 205, USDA will not make public any information disclosing a USDA-supported invention for a 2-year period to allow the grantee a reasonable time to file an initial patent application. Additional information may be obtained by contacting:

Mr. M. Howard Silverstein  
Deputy Assistant General Counsel for Patents  
Research and Operations Division  
Office of the General Counsel  
U.S. Department of Agriculture  
Room 2332, South Building  
14th and Independence Avenue, S.W.  
Washington, D.C. 20250

## **5.8 Cost-sharing**

Cost-sharing is permitted for proposals under this program solicitation; however, cost-sharing is not required nor will it be an evaluation factor in considering the competitive merit of proposals submitted.

## **5.9 Profit or Fee**

Fees will be allowed under both phase I and phase II awards. However, because of the limited amount of funds available, proposers are encouraged to keep such fees to a minimum.

## **5.10 Joint Ventures and Limited Partnerships**

Joint ventures and limited partnerships are eligible to apply for and to receive research grants under this program solicitation provided that the entity created qualifies as a small business as defined in subsection 2.2. (Unless the joint venture arrangement contains legally documented confirmation that it can act as a single entity, any resulting award will be issued to only one of the firms involved, with the others acting as either subcontractors or consultants.)

## **5.11 Research and Analytical Work**

- (A) For phase I a minimum of two-thirds of the research and/or analytical effort must be performed by the proposing firm unless otherwise approved in writing by the authorized departmental officer.



- (B) For phase II a minimum of one-half of the research and/or analytical effort must be performed by the proposing firm.

## 5.12 Research Involving Special Considerations

A number of situations frequently encountered in the conduct of scientific research require the submission of special information for a particular project. Since some types of research targeted for SBIR support have high probability of involving either recombinant deoxyribonucleic acid (DNA) molecules or human subjects at risk, special instructions follow:

If the proposed research will involve either recombinant DNA molecules or human subjects at risk, the proposal must so indicate. Further, in the event that the project is funded, the proposer may be required to have the research plan reviewed and approved by an appropriate "Institutional Review Board" prior to commencing actual substantive work. It is suggested that proposers contact local universities, colleges, or nonprofit research organizations which have established such reviewing mechanisms to have this service performed. (Appropriate forms and instructions will be forwarded to awardees whose projects involve recombinant DNA molecules or human subjects at risk when the funding agreement is transmitted for acceptance.)

Guidelines to be applied and observed when conducting such research are outlined below.

- (A) **Recombinant DNA Molecules** — Principal investigators and authorized organizational officials must comply with the "Guidelines for Research Involving Recombinant DNA Molecules" issued by the National Institutes of Health. (See 51 FR 16958 - 16985 and any subsequent revisions.)
- (B) **Human Subjects at Risk** — Guidelines to be used in safeguarding the rights and welfare of human subjects used in research supported with USDA grant funds are contained in Public Law 93-348, as implemented by Part 46, Subtitle A of Title 45 of the Code of Federal Regulations, as amended (45 CFR Part 46), issued by the Department of Health and Human Services.

## 5.13 Grantee Commitments

Upon issuance of a research grant by USDA, the awardee will be required to make certain legal commitments through acceptance of numerous clauses in the phase I or phase II funding agreement. Most of these clauses are contained in USDA's Uniform Federal Assistance Regulations, 7 CFR Part 3015, which will be incorporated into all awards resulting from this program solicitation and will be mailed in the package of materials when the research grant is forwarded to the awardee for acceptance. These regulations primarily consolidate internal policies and procedures relating to USDA's assistance programs and implement various federally issued assistance policies, in-

cluding applicable Federal cost principles and uniform administrative requirements.

Advance copies of these regulations are available upon request.

The following clauses illustrate the types of terms and conditions a small business firm will be asked to accept if awarded a research grant under this program. This is not a complete listing nor the exact wording of the clauses as they will appear in the funding agreement.

- (A) **Standards of Work** — Work performed under the grant must conform to high professional standards. Responsibility for performance of the principal investigator(s) and other employees or consultants who carry out the work lies with the management of the organization receiving the award.
- (B) **Inspection** — Work performed under the grant is subject to Government inspection and evaluation at all times.
- (C) **Examination of Records** — The Comptroller General (or a duly authorized representative) shall have the right to examine any directly pertinent records of the grantee involving transactions related to the funding agreement.
- (D) **Termination for Cause** — USDA may terminate the funding agreement in whole, or in part, if the grantee fails materially to perform the work for which the funding agreement is issued or otherwise fails to comply with the terms of the grant.
- (E) **Termination by Mutual Agreement** — The grant may be terminated in whole, or in part, when both parties agree that the continuation of the project would not produce beneficial results commensurate with the further expenditure of funds.
- (F) **Equal Opportunity** — The grantee shall not discriminate against any employee or applicant for employment because of race, color, religion, age, sex, national origin, physical or mental handicap, or status as a veteran of the Vietnam era.

## 5.14 Additional Information

- (A) This program solicitation is intended for informational purposes and reflects current planning. If there is any inconsistency between the information contained herein and the terms of any resulting SBIR funding agreement, the terms of the funding agreement are controlling.
- (B) Before the award of an SBIR funding agreement, USDA requires the submission of certain organizational management, personnel, and financial

information to assure responsibility of the proposer, including certification that the proposing organization is in compliance with the Civil Rights Act of 1964. Form S&E-666 (see both sides of appendix D) should be used to provide the necessary organizational information, and Form S&E-665 (see appendix E) should be used to certify compliance with Title VI of the Civil Rights Act of 1964. (If portions of the information requested on Form S&E-666 are not applicable to the proposing organization or entity, "NA" should be written in the space provided.) The information contained in both forms must be submitted **on a one-time basis only** to the address shown in subsection 6.3. (If sufficient changes occur within the organization to warrant submission of new or additional information, revised forms should be forwarded in the same manner.) It is anticipated that nearly all phase I awardees will be required to submit the above information, but phase II awardees will be concerned primarily with submitting new forms **only** if they have undergone significant changes in organization, personnel, or policies relating to civil rights. **Phase II awardees will be asked to submit an updated statement of financial condition.**

Although this information is not required unless a project is recommended for funding, it would be helpful if Forms S&E-665 and S&E-666 were submitted along with the proposal. For the convenience of proposers who will need to provide this information, these two forms may be stapled to the back of the proposal. **Management information will not be counted as part of any page limitations specified elsewhere in this program solicitation.**

- (C) USDA is not responsible for any monies expended by the proposer prior to the award of any funding agreement.
- (D) This program solicitation is not an offer by USDA and does not obligate USDA to make any specific number of awards. Also, awards under this program are contingent upon the availability of funds.
- (E) **Unsolicited proposals will not be accepted** under the SBIR program in either phase I or phase II.

- (F) If an award is made under this program solicitation, the grantee will be required to certify that it has not previously been, nor is currently being, paid for essentially equivalent work by **any agency** of the Federal Government.
- (G) Listed below are some of the sources that can provide technology search and document services which may be useful in preparing SBIR proposals. They can be contacted directly for service and cost information.

National Technical Information Service  
5285 Port Royal Road  
Springfield, Virginia 22161  
(703) 487-4600

Aerospace Research Applications Center  
P.O. Box 647  
Indianapolis, Indiana 46223  
(317) 264-4644

Kerr Industrial Applications Center  
Southeastern Oklahoma State University  
Durant, Oklahoma 74701  
(405) 924-6822

NASA/Florida State Technology Applications Center  
State University System of Florida  
500 Weil Hall  
Gainesville, Florida 32611  
(904) 392-6626

North Carolina Science and Technology Research Center  
P.O. Box 12235  
Research Triangle Park, North Carolina 27709  
(919) 549-0671

NASA Industrial Applications Center  
701 LIS Building  
University of Pittsburgh  
Pittsburgh, Pennsylvania 15260  
(412) 624-5211

NASA/UK Technology  
109 Kinkead Hall  
University of Kentucky  
Lexington, Kentucky 40506  
(606) 257-6322



## 6.0 SUBMISSION OF PROPOSALS

### 6.1 Deadlines for Proposals

All phase I proposals must be postmarked or delivered to the address shown in subsection 6.3 by November 17, 1986. **Proposals not postmarked or delivered by this date will be returned to the proposing organization without evaluation or consideration for award.**

All Phase II proposals must be postmarked or delivered to the address shown in subsection 6.3 by May 1, 1987. Proposals not postmarked or delivered by this date will be returned to the proposing organization without evaluation or consideration for award.

For the convenience of all potential proposers, the following schedule is provided for informational purposes:

#### Phase I

Proposal postmark or delivery	by November 17, 1986
Notification of awards and declinations	approximately May 15, 1987
Period of research performance	June 1, 1987 - November 30, 1987
Final Report due at USDA	December 31, 1987

#### Phase II

Proposal postmark or delivery	by May 1, 1987
Commitment for Phase III follow-on funding	by July 1, 1987
Notification of awards and declinations	approximately September 1, 1987
Beginning of period of research performance	approximately September 1, 1987

### 6.2 Number of Copies

Proposers under both phase I and phase II are requested to submit an original and 9 copies of all proposals. These proposals

must contain all of the information, **arranged in the same order**, as that outlined in section 3.0.

### 6.3 Address

All proposals, whether phase I or phase II, should be mailed or delivered to:

Proposal Services Unit  
Grants Administrative Management  
Office of Grants & Program Systems  
U.S. Department of Agriculture  
Room 010, Justin Smith Morrill Building  
15th and Independence Avenue, S.W.  
Washington, D.C. 20251

### 6.4 Acknowledgment of Proposals

All proposals will be acknowledged. The acknowledgment will be issued in the form of a letter and, at a minimum, will contain the title of the proposed project, proposal number assigned by USDA, and date of receipt. Later inquiries, submissions of addenda prior to the applicable deadline for proposals, and the like should include this information.

### 6.5 Bindings

Do not use special bindings or covers on proposals submitted in response to this program solicitation. Staple all pages together securely in the upper left-hand corner of each copy of each proposal.

### 6.6 Packaging

If possible, all 10 copies of each proposal should be mailed in one package. Due to the volume of proposals received, applications submitted in several packages are very difficult to identify and track. If it becomes necessary to mail copies of a proposal in more than one package, the number of packages should be marked on the outside of each. It is important that **all packages be mailed at the same time.**

## 7.0 CONTACT WITH USDA

### 7.1 Questions Pertaining to the USDA SBIR Program or to this Solicitation

Written or verbal questions of a general nature about the USDA SBIR Program, as well as general questions pertaining to this solicitation (but **not** pertaining to requests for additional copies of the solicitation), should be directed to:

Dr. Olga v.H. Owens  
SBIR Coordinator  
Competitive Research Grants  
Office of Grants and Program Systems  
U.S. Department of Agriculture  
Room 112, Justin Smith Morrill Building  
15th and Independence Avenue, S.W.  
Washington, D.C. 20251  
(202) 447-7002

### 7.2 Requests for Additional Copies of this Solicitation

Additional copies of this solicitation may be ordered by writing to the address shown in subsection 6.3 or by calling (202) 475-5048.

### 7.3 Information on Proposal Status

It is anticipated that the evaluation of **phase I** proposals and the award of research grants will be made approximately 6 months from November 17, 1986, and no information on proposal status will be available until final selections have been made. Both successful and unsuccessful proposers will be notified of final award decisions within 6 months.

Evaluation of **phase II** proposals and the award of research grants will require approximately 4 months from May 1, 1987. Again, proposers are discouraged from making inquiries regarding the status of their proposals. All proposing organizations will be notified of final award decisions within approximately 4 months.

## 8.0 RESEARCH TOPIC DESCRIPTIONS

SBIR proposals are solicited from the full range of topic areas that follow. Specific subtopics are listed only as **examples** of advanced applications or basic research of interest to USDA and are **not to be interpreted as exclusive**. It is USDA's intention to provide sufficient flexibility to obtain the greatest degree of creativity and innovation possible, consistent with overall SBIR and USDA program objectives. USDA reserves the right to shift a proposal to a more appropriate topic when necessary for adequate review.

### 8.1 Forests and Related Resources

#### (A) Scope of Research

The objective of this topic is to develop environmentally sound techniques to increase productivity of forest land and to increase the utilization of materials and resources from forest lands. These areas deal with (1) increasing growth and yield through improving planting stock, reducing pathogens and insects, improving the soil or reducing harvesting impacts, and developing means to ensure survival of newly planted trees; (2) increasing the utility of the material grown in the forest through improving lumber yield from trees, utilizing greater percentages of trees, and using residues from forest and wood manufacturing systems; (3) reducing ecological insults from forest operations; and (4) developing

new products or technologies to increase the use of wood.

#### (B) Suggested Subtopics

Appropriate subtopics for innovative research proposals from small business firms include, but are not limited to, the following:

##### (1) Growth and Yield

- Improving growing stock, tissue culture, genetic manipulation or vegetative reproduction of forest trees, and other means of increasing the regenerative abilities of forests.
- Reducing pathogens and insects — The volume of material lost to disease and insects exceeds that used for lumber and associated wood products. Subjects applicable here are those that reduce the impact of destructive agents.
- Improving soil or reducing harvesting impacts — The fixing of nitrogen by symbiotic agents through genetic manipulation or by mycorrhizae to increase forest productivity through nitrogen enrichment of forest soils;



research to reduce soil erosion, compaction, or other alterations caused by harvesting or forest operations (that is, physical improvement of forest soils).

- Developing systems to increase the survival of newly planted trees through mechanical, physical, or chemical means that are environmentally safe.

## **(2) Increasing the utility of forest-grown material**

- Improving lumber yield or other means of increasing the volume and worth of wood from individual trees.
- Utilizing a greater percentage of the tree through improved or new techniques of veneering or comminution so that new or improved reconstituted products can be made.

## **(3) Reducing ecological insults by forest operations** — Research which provides for the economic recovery of resources from forests while raising potential productivity and reducing impacts to the ecological structure of the area of operation.

## **(4) Developing new products or technologies to increase the use of wood** — Products using wood as a basic component of systems to replace or compete with construction materials or techniques.

## **8.2 Plant Production and Protection**

### **(A) Scope of Research**

The objective of this research topic area is to examine means of increasing the efficiency of crop production by reducing the impact of destructive agents, enhancing the impact of new methods of plant manipulation, and developing effective crop systems that are economical and environmentally sound.

### **(B) Suggested Subtopics**

Examples of research activities that would be appropriate for small business firms include, but are not limited to, the following:

- (1) Pathology** — Research to reduce pathogens of crop plants or to render plants resistant to pathogens.
- (2) Pests** — Research to reduce pests or render plants resistant to pests; development of efficient and environmentally safe pesticide usage equipment.

### **(3) Breeding** — Innovative methods for increasing the efficiency of crop production by means of:

- Tissue cultures and embryogenesis.
- Molecular genetics.

### **(4) Energy conservation** — Development of crop management systems, farm structures, and waste utilization for efficient use of energy.

## **8.3 Animal Production and Protection**

### **(A) Scope of Research**

The overall objective of this topic area is to develop knowledge that will enable producers of food animals to increase production efficiency and to assure a reliable, safe supply of animal protein and other animal products while conserving resources and reducing costs of production. Some examples of the areas of research to be supported are clarification of the nutritional requirements of food animals for improved growth and feed efficiency, hormonal and cellular mechanisms which control reproduction and multiple births; clarification of genetic processes that result in food animals with superior characteristics; improved methods of disposal of animal wastes; and diagnosis, treatment, and control of food animal diseases, parasitisms, and other animal health hazards.

### **(B) Suggested Subtopics**

Appropriate subtopics for innovative research proposals from small business firms include, but are not limited to, the following:

#### **(1) Animal Production**

##### **(a) Animal nutrition and digestive physiology** — Research that will do the following:

- Clarify cellular processes associated with protein synthesis and animal growth.
- Clarify interrelationships between alimentary microbial ecosystems, digestive processes, and the host animal.
- Provide nutritional characterization of feed-stuffs and integrated nutrient management to enhance production efficiency.

##### **(b) Animal reproduction** — Hormonal, cellular, or other studies that will do the following:

- Permit the control of estrus, ovulation, and fertilization.
- Enhance embryo survival and development.

- Enhance parturition and perinatal survival.
- Provide advancement in embryo technology such as sex control, twinning, frozen embryos, and cloning.

(c) **Animal genetics and breeding** — Studies aimed at germplasm improvement in food animals that will provide animals with superior characteristics in areas such as reproduction, growth and development, lactation and egg production, lean-to-fat ratios, and disease resistance.

(d) **Livestock management systems** — Development of systems or processes that can be applied to food animal production enterprises that will provide greater efficiency in the production process.

## (2) Animal Protection

### (a) Diagnostic tests —

- Development of diagnostic tests for specific infectious or noninfectious diseases and parasitisms.
- Development of assay tests for toxins, drugs, pesticides, and other agricultural chemicals which pose a health hazard to food animals and a residue problem in animal food products.
- Development of diagnostic kits for on-farm use to assist in the rapid diagnosis of specific animal health problems to permit early initiation of effective countermeasures.

(b) **Therapeutic methods** — Treatment or treatment methods for acute or chronic health problems of food animals caused by specific infectious or noninfectious agents, parasitisms, chemicals and toxic agents, poisonous plants, injuries, and other animal health hazards.

(c) **Immunization methods** — Vaccines, bacterins, or other methods to establish or enhance resistance of food animals to infectious diseases and parasitisms.

(d) **Pest control strategies** — Development of alternative pest control or eradication methods so as to limit the use of and dependence on biotoxic substances. Such alternatives may include biological methods,

sterile male techniques, artificial pheromones, and similar strategies.

(e) **Preventive management** — Development of management methods designed to protect food animals against health hazards.

(f) **Animal health costs** — Development of methodologies to accurately assess economic losses to animal health hazards and to measure economic benefits of alternative methods of prevention and control.

## 8.4 Air, Water, and Soils

### (A) Scope of Research

The objective of this research area is to develop technologies for conserving air, water, and soil resources while sustaining agricultural productivity. This involves developing means to effectively control resources to increase farm and forest productivity as well as the manufacture of resulting commodities.

### (B) Suggested Subtopics

Examples of appropriate subtopics for research proposals from small businesses include, but are not limited to, the following:

- (1) Research to reduce losses of soil and soil nutrients or alteration of the physical nature of soil; technologies that enhance soil properties while restricting environmental insults.
- (2) Studies involving reduction of wind-caused erosion of soil; abatement of air pollution stemming from agricultural and forestry enterprises; utilization of air components for agricultural purposes.
- (3) Development of improved methodologies for conserving water resources, restoring water quality, and determining proper irrigation usage to meet current and future agricultural and forestry needs.

## 8.5 Food Science and Nutrition

### (A) Scope of Research

The objectives of food science and nutrition research programs are to develop new knowledge and a better understanding of the characteristics of the foods we eat and their nutritional impact; to apply new knowledge to improve our foods and our diets; and to systematically apply new knowledge to the production of useful new food products, processes, materials, and systems, including application of nutritional



information to consumer foods and food service systems.

**(B) Suggested Subtopics**

Research opportunities are many and varied. Areas appropriate for innovative research proposals from small business firms might include, but not necessarily be limited to, the following:

- (1) Chemistry and biochemistry** — Novel or rapid assay or bioassay techniques for food constituents, nutrients, properties, or interactions. Quality control techniques or rapid methods for in-plant nutrient analyses are needed.
- (2) Microbiology and toxicology** — Rapid, efficient methods for determining presence of organisms and detecting the development of toxic metabolites, including systems for determining shelf-life and “pull date” of food items, are needed.
- (3) Processing** — Methods for automation of processes and tests; rapid analyses and cataloging of physical properties; processing parameters; package design; design of material; energy- and water-efficient processes for small industries; development of specialty products

or processes; on-line monitoring and control of nutrient, ingredient, or additive levels.

- (4) Economics and statistics** — Improved sampling procedures for dry mixes; cost-benefit analyses; and modeling systems, including distribution, warehousing, and retailing systems.

## **8.6 Rural and Community Development**

**(A) Scope of Research**

The objectives of this research are to foster, promote, or improve the well-being of rural Americans. The SBIR Program supports the application of social science research to issues and problems related to the development of rural areas, small towns, rural people, rural organizations, and rural institutions.

**(B) Suggested Subtopics**

Examples of research of interest in this category include, but are not limited to, the following:

- (1)** Application of sociological principles to processes that promote or foster **development of income or employment opportunities or improvements in services** to rural people.
- (2)** Development of **technological or informational systems** to assist local governments or public institutions in rural areas.





U.S. DEPARTMENT OF AGRICULTURE  
**SMALL BUSINESS INNOVATION RESEARCH**  
**SOLICITATION NO. USDA/87—1**  
**PHASE I**  
**PROPOSAL COVER SHEET**

APPENDIX A

Proposal No.

Date Received

<b>SUBMITTED BY</b>	<div style="border-bottom: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <b>Firm</b>								
	<div style="border-bottom: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <b>Mailing Address</b>								
<b>Project Title</b>									
Topic No. and Area (check appropriate box; see Section 8.0) <table style="width: 100%; margin-top: 10px;"> <tr> <td><input type="checkbox"/> 8.1 Forests and Related Resources</td> <td><input type="checkbox"/> 8.4 Air, Water, and Soils</td> </tr> <tr> <td><input type="checkbox"/> 8.2 Plant Production and Protection</td> <td><input type="checkbox"/> 8.5 Food Science and Nutrition</td> </tr> <tr> <td><input type="checkbox"/> 8.3 Animal Production and Protection</td> <td><input type="checkbox"/> 8.6 Rural and Community Development</td> </tr> </table>				<input type="checkbox"/> 8.1 Forests and Related Resources	<input type="checkbox"/> 8.4 Air, Water, and Soils	<input type="checkbox"/> 8.2 Plant Production and Protection	<input type="checkbox"/> 8.5 Food Science and Nutrition	<input type="checkbox"/> 8.3 Animal Production and Protection	<input type="checkbox"/> 8.6 Rural and Community Development
<input type="checkbox"/> 8.1 Forests and Related Resources	<input type="checkbox"/> 8.4 Air, Water, and Soils								
<input type="checkbox"/> 8.2 Plant Production and Protection	<input type="checkbox"/> 8.5 Food Science and Nutrition								
<input type="checkbox"/> 8.3 Animal Production and Protection	<input type="checkbox"/> 8.6 Rural and Community Development								
<b>Amount Requested (\$)</b>		<b>Proposed Duration (Mos.)</b>							
1. The above concern certifies that it is a small business firm and meets the definition as stated in this solicitation (See Subsection 2.2).			<b>YES</b>						
2. The above concern certifies that it qualifies as a minority and disadvantaged small business as defined in this solicitation (See Subsection 2.3).			<b>NO</b>						
3. The above concern certifies that it qualifies as a women-owned small business as defined in this solicitation (See Subsection 2.4).									
4. The above concern certifies that the Principal Investigator's primary employment will be with proposing firm at the time of any resulting award and during the conduct of the proposed research (See Subsection 2.2(C)).									
5. Will you permit the Government to disclose the title and technical abstract page of your proposed project, plus the name, address, and telephone number of the corporate official of your firm, if your proposal does not result in an award, to entities that may be interested in contacting you for future information?									
6. Do you plan to send, or have you sent, this proposal or a similar one to any other Federal agency? If yes, give acronym(s); e.g., DOE, NIH, NSF, etc.									
<b>PRINCIPAL INVESTIGATOR</b>		<b>AUTHORIZED ORGANIZATIONAL OFFICIAL</b>							
<b>Name</b>		<b>Name</b>							
<b>Title</b>		<b>Title</b>							
<b>Address</b>		<b>Address</b>							
<b>Telephone No.</b>		<b>Telephone No.</b>							
<b>Signature</b>	<b>Date</b>	<b>Signature</b>	<b>Date</b>						

PROPRIETARY NOTICE (IF APPLICABLE, SEE SUBSECTION 5.4)



U.S. DEPARTMENT OF AGRICULTURE  
SMALL BUSINESS INNOVATION RESEARCH  
PHASE I AND PHASE II  
PROJECT SUMMARY\*

APPENDIX B

<i>FOR USDA USE ONLY</i>			
Program Office	Solicitation No.	Proposal No.	Topic No.
<i>TO BE COMPLETED BY PROPOSER</i>			
Name and Address of Firm		Name and Title of Principal Investigator(s)	
Title of Project (80-character maximum)			
Technical Abstract (200-word limit)			
Anticipated Results/Potential Commercial Applications of Research (100-word limit)			
Keywords to Identify Technology/Research Thrust/Commercial Application (8-word maximum)			

\*The Project Summary must be suitable for publication by USDA in the event of an award. *Do not include proprietary information on this page.*





U.S. DEPARTMENT OF AGRICULTURE  
SCIENCE AND EDUCATIONOMB Approved 0520-0001  
Expires 12/31/86

## PROPOSAL BUDGET

ORGANIZATION AND ADDRESS				DURATION PROPOSED	S&E USE ONLY
PRINCIPAL INVESTIGATOR(S)/PROJECT DIRECTOR(S)				Months: _____ FUNDS REQUESTED BY PROPOSER	Months: _____ FUNDS APPROVED BY S&E (If different)
A. Salaries and Wages		S&E FUNDED WORK MONTHS			
		Calendar	Academic	Summer	
1. No. of Senior Personnel					
a. ____ (Co)-PI(s)/PD(s) . . . . .					\$
b. ____ Senior Associates . . . . .					\$
2. No. of Other Personnel (Non-Faculty)					
a. ____ Research Associates-Postdoctorate					
b. ____ Other Professionals . . . . .					
c. ____ Graduate Students . . . . .					
d. ____ Pre-Baccalaureate Students . . . . .					
e. ____ Secretarial-Clerical . . . . .					
f. ____ Technical, Shop, and Other . . . . .					
Total Salaries and Wages . . . . . ▶					
B. Fringe Benefits (If charged as Direct Costs)					
C. Total Salaries, Wages, and Fringe Benefits (A plus B) . . . . . ▶					
D. Nonexpendable Equipment (Attach supporting data. List items and dollar amounts for each item.)					
E. Materials and Supplies					
F. Travel					
1. Domestic (Including Canada) . . . . .					
2. Foreign (List destination and amount for each trip.)					
G. Publication Costs/Page Charges					
H. Computer (ADPE) Costs					
I. All Other Direct Costs (Attach supporting data. List items and dollar amounts. Details of subcontracts, including work statements and budget, should be explained in full in proposal.)					
J. Total Direct Costs (C through I) . . . . . ▶					
K. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases.)					
L. Total Direct and Indirect Costs (J plus K) . . . . . ▶					
M. Less Residual Funds (If applicable) . . . . . ▶					
N. TOTAL AMOUNT of this REQUEST (L minus M) . . . . . ▶				\$	\$
O. COST SHARING . . . . . ▶				\$	

NOTE: Signatures required only for Revised Budget

This is Revision No. ▶

NAME AND TITLE (type or print)	SIGNATURE	DATE
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR		
AUTHORIZED ORGANIZATIONAL REPRESENTATIVE		





## ORGANIZATIONAL INFORMATION

1. LEGAL NAME OF ORGANIZATION &amp; COMPLETE BUSINESS ADDRESS

**NOTE:** Submit the following information.  
Identify attached information by number and item.

**2. Organizational Affiliations** — Describe relationship of the organization to a parent organization or to subsidiaries of other affiliates. If the organization is a successor in interest to a predecessor or if changes in organizational affiliation are anticipated, describe briefly.

**3. Statement of Purposes and Powers** — Attach an official or published statement of the major purposes of the organization as to the powers which have been granted to it to enter into contractual relationships and/or to accept grants, *e.g.*, articles of incorporation, terms of reference, by-laws, etc.

## 4. KEY OFFICIALS AND AFFILIATIONS

NAME, TITLE, AND TELEPHONE NO.	AFFILIATED WITH?				IF No, IS CHECKED, DESCRIBE AFFILIATION	
	College or University		State or Local Government			
	Yes	No	Yes	No		
Chief Executive		(S)				
Authorized Organizational Representative						
Business Officer						

**5. Is your organization currently** a grantee or contractor of any component of the U.S. Department of Health and Human Services (formerly Department of Health, Education and Welfare)? This information will assist in implementing certain interagency procedures for which DHHS is the lead agency. ☐ YES ☐ NO

**6. If your organization is other than a college or university or a State or local government, attach**

- A certified statement of financial conditions (*usually by Certified Public Accountant*) covering at least the preceding 2 years.
- Bank or other references.

**7. Assurance of Compliance** — Attach completed Form S&E-665.



## CERTIFICATION

1. I certify that \_\_\_\_\_ has legal authority to accept grants  
(Name of institution or organization)  
and the requisite policies, procedures, and personnel to ensure stewardship of Federal funds and management of Federally supported projects, specifically including standards for financial management, procurement, and property management, which meet those described in Attachments F, N, and O to OMB Circular A-110. *(In the event this is not the case, attach a list of exceptions and provide a realistic estimate of when such standards might be met.)*
2. Each proposal to the S&E Grants Administrative Management Office will be consistent with the policies and goals of the proposed grantee and will be submitted in accordance with its procedures and pursuant to appropriate authority.
3. In the event that a grant is awarded as a result of any such proposal, I agree that the proposed grantee organization will:
- A. Make available the necessary facilities, equipment, services, and personnel to conduct the project substantially as outlined in the proposal or such modifications thereof as may be mutually agreed.
  - B. Conduct such project oversight as may be appropriate, manage the Federal funding with probity and prudence, and comply with all the terms and conditions of the grant.
  - C. Ensure that costs which S&E is being asked to support are allowable and the treatment of direct and indirect costs in the proposal budget is consistent with applicable Federal cost principles and with the policies of the submitting organization.  
  
**Allowable Costs** — Payment up to the amount specified in the Agreement shall be made only for allowable costs actually incurred in conducting the work under the Agreement in accordance with its terms.  
  
The determination of allowable costs shall be made in accordance with the following applicable Federal Cost Principles in effect on the effective date of the Agreement:
    - Educational Institutions, OMB Circular A-21
    - Non-Profit Organizations, OMB Circular A-122
    - Commercial Firms, FPR 1-15.2
    - State and Local Governments, OMB Circular A-87
  - D. Comply with all applicable laws and regulations.

TYPED NAME AND TITLE OF  
AUTHORIZED ORGANIZATIONAL  
REPRESENTATIVE

SIGNATURE

DATE

UNITED STATES DEPARTMENT OF AGRICULTURE  
SCIENCE AND EDUCATIONASSURANCE OF COMPLIANCE  
with the  
DEPARTMENT OF AGRICULTURE REGULATIONS  
UNDER TITLE VI of the CIVIL RIGHTS ACT of 1964 *(as amended)***NOTE:** Not required if previously submitted to S&E/GAMO.

Legal name of proposed grantee \_\_\_\_\_ *(hereinafter called the Applicant)* hereby agrees that it will comply with Title VI of the Civil Rights Act of 1964, as amended, and all requirements imposed by or pursuant to the Regulations of the Department of Agriculture, 7 CFR Part 15, Subpart A, issued pursuant thereto, to the end that, in accordance with Title VI of that Act and the regulations, no person in the United States shall, on the ground(s) of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Applicant receives Federal financial assistance from the Department of Agriculture; and hereby gives assurance that it will immediately take any measures necessary to effectuate this agreement.

This assurance is given in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts, property, discounts or other Federal financial assistance extended after the date hereof to the Applicant by the Department, including installment payments after such date on account of applications for Federal financial assistance which were approved before such date. The Applicant recognizes and agrees that such Federal assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Applicant, its successors, transferees, and assignees, and the person or persons whose signature(s) appear below are authorized to sign this assurance on behalf of the Applicant.

SIGNATURE(S) OF AUTHORIZED ORGANIZATIONAL REPRESENTATIVE(S)

DATE

APPLICANT'S MAILING ADDRESS













OGPS-GAM-PSU

Room 010, Justin Smith Morrill Building

UNITED STATES

DEPARTMENT OF AGRICULTURE

WASHINGTON, D.C. 20251

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, \$300



FIRST CLASS

POSTAGE AND FEES PAID  
U.S. DEPARTMENT OF AGRICULTURE  
AGR-101